NOTE: The document identifier and heading has been changed on this page to reflect that this is a performance specification. There are no other changes to this document. The document identifier on subsequent pages has not been changed, but will be changed the next time this document is revised.

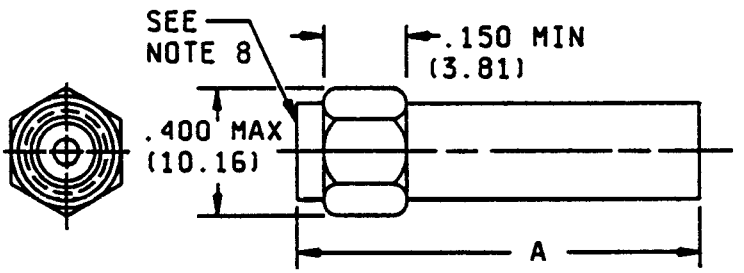
INCH-POUND
MIL-PRF-39012/55F
27 January 1992
SUPERSEDING
MIL-C-39012/55E
3 October 1986

PERFORMANCE SPECIFICATION

CONNECTORS, PLUGS, ELECTRICAL, COAXIAL, RADIO FREQUENCY, (SERIES SMA (CABLED) - PLUG, PIN CONTACT, CLASS 2)

This specification is approved for use by all Departments and Agencies of the Department of Defense.

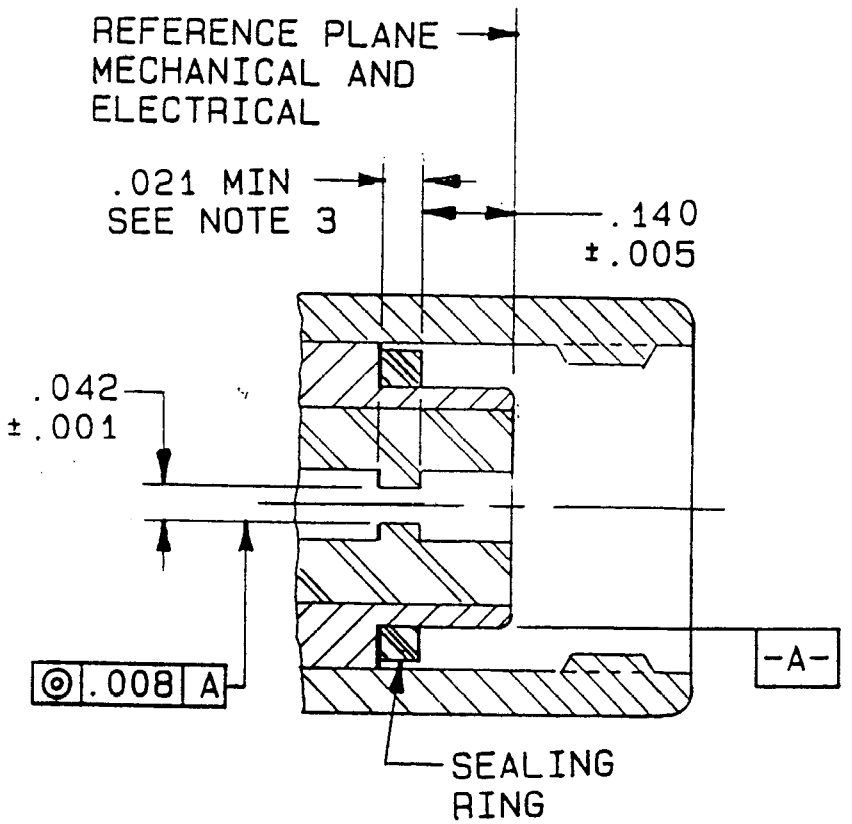
The requirements for acquiring the product described herein shall consist of this specification sheet and the issue of the following specification listed in that issue of the Department of Defense Index of Specifications and Standards (DODISS) specified in the solicitation: MIL-PRF-39012.



MARKING IMPLEMENTATION DATE, CATEGORY B, SEE TABLE VII

NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. For dimension A, see tables I and V.
4. Dimension .400 (10.16) is the largest overall diameter of the connector.
5. Width across flats are to accommodate wrench, nominal size of .3125 (7.938 mm) minimum in accordance with FED-STD-H28, appendix 10, wrench openings.
6. Dimension A defines the overall length of connector when assembled to the cable.
7. All undimensioned pictoral configurations are for reference purposes only.
8. Series SMA, pin contact interface in accordance with MIL-STD-348.
9. Metric equivalents are in parentheses.

FIGURE 1. General configuration.



CATEGORY D

Insulator dimensions for category D only

Inches	mm
.001	0.03
.005	0.13
.008	0.20
.021	0.53
.042	1.07
.140	3.56

NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Chamfer is optional, if chamfer is used put chamfer on a 30° maximum.
4. Three holes .016 (0.41 mm) minimum diameter, equally spaced, are required for safety wiring after mating. Location on coupling nut optional.

FIGURE 2. Category D captivation detail.

TABLE I. Dash numbers, cross reference and dimensions.

Dash number	Applicable cable #	Dimensions	Inches-millimeters maximum 1/ 2/ 3/
Category A - Field serviceable (no special tools required) 4/ 5/			
3006 3106 6/ 4006 4106 6/	M17/93-RG178 * M17/169-00001 ϕ	A	1.030 (26.16)
3007 3107 6/ 4007 4107 6/	M17/119-RG174 M17/173-00001 ϕ M17/113-RG316 * M17/172-00001 ϕ		
3008 3108 6/ 4008 4108 6/	M17/54-RG122 * M17/157-00001 ϕ		
3009 3109 6/ 4009 4109 6/	M17/28-RG058 M17/60-RG142 @ M17/84-RG223 * M17/155-00001 ϕ M17/158-00001 ϕ M17/167-00001 ϕ		
3010 3110 6/ 4010 4110 6/	M17/111-RG303 * @ M17/170-00001 ϕ		
3030 3130 6/ 4030 4130 6/	M17/152-00001		

See footnotes at end of table.

TABLE I. Dash numbers, cross reference and dimensions - Continued.

Dash number	Applicable cable #	Dimensions	Inches-millimeters maximum 1/ 2/ 3/
Category C - Field replaceable (MIL-C-22520 crimp tool) 4/ 7/			
3025 3125 6/ 4025 4125 6/	M17/93-RG178 ∞ * M17/169-00001 ∞ ϕ		
3026 3126 6/ 4026 4126 6/	M17/119-RG174 Σ M17/173-00001 Σ ϕ M17/113-RG316 Σ * M17/172-00001 Σ ϕ		
3027 3127 6/ 4027 4127 6/	M17/54-RG122 * & M17/157-00001 ϕ &	A	1.250 (31.75)
3028 3128 6/ 4028 4128 6/	M17/60-RG142 @ ~ M17/158-00001 ~ ϕ M17/167-00001 ~ ϕ M17/84-RG223 * ~		
3029 3129 6/ 4029 4129 6/	M17/155-00001 ~ ϕ M17/28-RG058 * ~ M17/111-RG303 ~ M17/170-00001 ~ ϕ		
Category D - Field replaceable - Defined piece parts 4/ 7/ 8/ 9/			
3502 3602 6/ 4502 4602 6/	M17/60-RG142 @ * M17/158-00001 ϕ M17/128-RG400 M17/175-00001 ϕ	A	1.250 (31.75)

1/ Millimeters are in parentheses.
2/ For logistics purposes, only connectors with safety wire holes will be stocked.
3/ Coupling nuts shall be corrosion resistant steel with a passivated finish in accordance with MIL-F-14072 (applies only to "-3XXX series connector).
4/ These connectors have captivated center contacts.
5/ All corrosion resistant steel bodied connectors which are designed to be assembled to the cable outer conductor using solder shall be gold plated in accordance with MIL-G-45204, type II, class I.
6/ No safety wire holes.
7/ These connectors are assembled, using the applicable crimp tool, to the specified cables stripped as shown on figure 4.
8/ Complete connector assembly shall consist of a body, center contact, ferrule, and assembly instructions.

TABLE I. Dash numbers, cross reference and dimensions - Continued.

9/ Not for use in army equipment.

\# The latest version of each cable shall be applicable.
* Cable to be used when performing tests requiring cable except as in note @.
@ Cable to be used for the +200°C temperature cycling tests. Connectors mate with connectors of the same material; i.e., M39012/59-3001 mates with M39012/55-3001, and M39012/59-4001 mates with M39012/55-4001.
% Preferred die M22520/5-33 closure B, alternate die M22520/5-03 closure B.
Σ Preferred die M22520/5-35 closure B, alternate die M22520/5-03 closure A.
& Preferred die M22520/5-41 closure B, alternate die M22520/5-05 closure B, or -09 closure A.
- Preferred die M22520/5-19 closure B, alternate die M22520/5-05 closure A or -11, -57, closure A.
ϕ Caution is directed to the application of this cable above 400 MHz. Attenuation is tested only at 400 MHz. SRL and power handling capabilities are not stipulated herein.

ENGINEERING DATA:

Nominal impedance: 50 ohms.

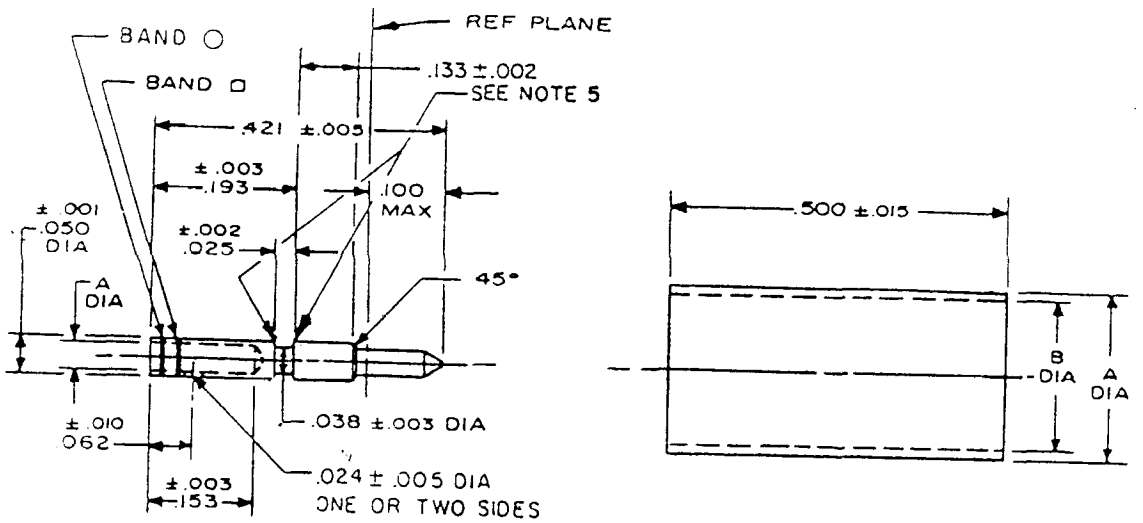
Frequency range: 0 to 12,400 MHz.

Voltage rating: The voltage rating shall be in accordance with table II.

TABLE II. Voltage rating.

Cables	Voltage max (at sea level)	Voltage max (70,000 feet)
	V rms	V rms
M17/93-RG178, M17/169-00001	170	45
M17/54-RG122, M17/157-00001 M17/119-RG174, M17/173-00001 M17/94-RG179, M17/113-RG316, M17/172-00001 M17/152-00001	250	65
M17/28-RG58, M17/155-00001 M17/60-RG142, M17/158-00001 M17/84-RG223, M17/167-00001 M17/111-RG303, M17/170-00001 M17/128-RG400, M17/175-00001	335	85

Temperature rating: -65°C to +165°C.



CENTER CONTACT

CRIMP FERRULE

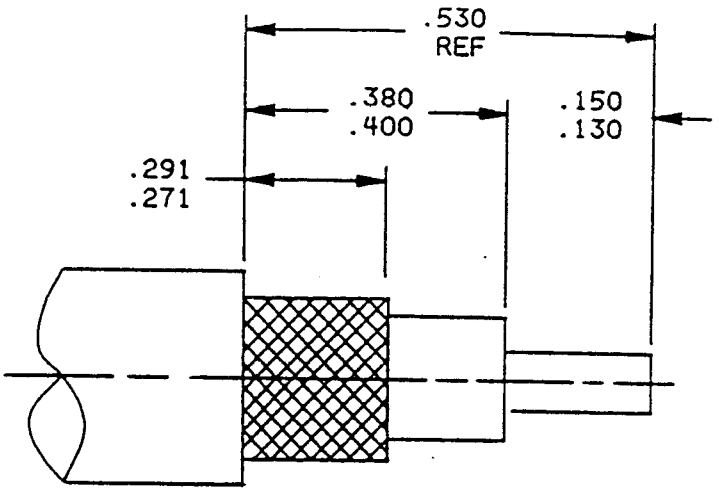
Dash no.	Contact no. 2/	A ±.001	Basic crimp tool 1/	Crimp die or positioner	Crimp tensile minimum	Color band □	Color band ○
3502 4502	55-10	.041	M22520/1-01	Solder or M22520/1-15	6 pounds	Red	Silver

Dash no.	Ferrule no. 2/	A ±.003	B ±.003	Basic crimp tool 1/	Crimp die or positioner M22520/5-	Inches	mm	Inches	mm
						.001	0.03	.050	1.27
						.002	0.05	.062	1.57
						.003	0.08	.100	2.54
						.005	0.13	.133	3.38
						.010	0.25	.153	3.89
3502 4502	55-50	.250	.220	M22520/5-01	M22520/5 -05,-11,-57 Closure A or 19 Closure B	.015 .024 .025 .038 .041	0.38 0.61 0.64 0.97 1.04	.193 .220 .250 .421 .500	4.90 5.59 6.35 10.69 12.70

1/ Class 2 tool may be used by OEM (see MIL-C-22520).
2/ Contact numbers and ferrule numbers are for identification only.

NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Crimp tensile test shall be in accordance with MIL-C-39029.
4. Copyright notice: All information disclosed in these specification sheets which is or may be copyrighted is reproduced herein with the express permission of the copyright owner.
5. .003 maximum break.
6. Color bands shall be positioned so that no coloring material enters the inspection hole.

FIGURE 3. Contact and ferrule dimensions for category D only.



Inches	mm
.130	3.30
.150	3.81
.271	6.88
.291	7.39
.380	9.65
.400	10.16
.530	13.46

NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for general information only.

FIGURE 4. Cable stripping dimensions for field replaceable connectors.

REPRINTED WITHOUT CHANGE

REQUIREMENTS:

Dimensions and configuration: See figure 1.

Force to engage and disengage:

Longitudinal force: Not applicable.

Torque: 2 inch-pounds, maximum.

Coupling proof torque: 15 inch-pounds, minimum.

Inspection conditions: For each test of threaded coupling connector where the test is performed on mated pairs, the pairs shall be torqued to 7 to 10 inch-pounds.

Mating characteristics: Reference MIL-STD-348 and figure 2 for dimensions.

Hermetic seal: Not applicable.

Leakage (pressurized connectors): Not applicable.

Insulation resistance: Method 302 of MIL-STD-202, test condition B.

5,000 megohms, minimum.

Center contact retention: 6 pounds, minimum axial force. Applicable to captivated-center-contact connectors only.

Radial torque: Not applicable.

Corrosion (salt spray): Method 101 of MIL-STD-202, test condition B.

Voltage standing wave ratio (VSWR): From 0.5 to 12.4 GHz, or approximately 80 percent of the cutoff frequency of the test cable, whichever is lower.

Cables	VSWR
M17/93-RG178	1.20+0.025 (F) GHz
M17/54-RG122 M17/119-RG174 M17/94-RG179 M17/113-RG316, M17/152-00001	1.15+0.02 (F) GHz
M17/28-RG058 M17/60-RG142 M17/84-RG223 M17/111-RG303 M17/128-RG400	1.15+0.01 (F) GHz

Swept frequency VSWR test setup:

Item 6: VSWR shall be less than 1.025+.002 F (F in GHz).

Item 16: VSWR shall be less than 1.025+.002 F (F in GHz).

Second step of VSWR checkout procedure: VSWR shall be less than 1.080+.005 F (F in GHz).

Group B inspection: Use step 5, long cable method.

Qualification and group C inspection: Use step 5, long cable method.

Connector durability: Insertion and withdrawal force: 500 cycles, minimum at 12 cycles per minute, maximum. The connector shall meet the mating characteristics and force to engage and disengage requirements.

Contact resistance: In milliohms, maximum.

	Initial	After environment
Center contact:	3.0	4.0
Outer contact:	2.0	Not applicable
Braid to body:	0.5 1/	Not applicable

Dielectric withstanding voltage at sea level:

Method 301 of MIL-STD-202.

Cables	V rms
M17/93-RG178, M17/169-00001	500
M17/54-RG122, M17/157-00001 M17/119-RG174, M17/173-00001 M17/94-RG179 M17/113-RG316, M17/172-00001, M17/152-00001	750
M17/28-RG058, M17/155-00001 M17/60-RG142, M17/158-00001 M17/84-RG223, M17/167-00001 M17/111-RG303, M17/170-00001 M17/128-RG400, M17/175-00001	1,000

Vibration, high frequency: Method 204 of MIL-STD-202, test condition D. No discontinuity permitted.

Shock: Method 213 of MIL-STD-202, test condition I. No discontinuity permitted.

Thermal shock: Method 107 of MIL-STD-202, test condition B, except test high temperature shall be +85°C.

High temperature shall be +200°C for connectors using +200°C cables (see tables I and V).

Moisture resistance: Method 106 of MIL-STD-202.

No measurements at high humidity. Insulation resistance shall be at least 200 megohms within 5 minutes after removal from humidity.

1/ Five milliohms are permissible on all passivated steel bodied connectors.

Corona level:

Altitude: 70,000 feet.

Cables	Volts (min)
M17/93-RG178, M17/169-00001	125
M17/54-RG122, M17/157-00001 M17/119-RG174, M17/173-00001 M17/94-RG179 M17/113-RG316, M17/172-00001, M17/152-00001	190
M17/28-RG058, M17/155-00001 M17/60-RG142, M17/158-00001 M17/84-RG223, M17/167-00001 M17/111-RG303, M17/170-00001 M17/128-RG400, M17/175-00001	250

RF high potential withstanding voltage:

Frequency: 5 to 7.5 MHz

Leakage current: Not applicable.

Cables	Volts (min)
M17/93-RG178, M17/169-00001	335
M17/54-RG122, M17/157-00001 M17/119-RG174, M17/173-00001 M17/94-RG179 M17/113-RG316, M17/172-00001, M17/152-00001	500
M17/28-RG058, M17/155-00001 M17/60-RG142, M17/158-00001 M17/84-RG223, M17/167-00001 M17/111-RG303, M17/170-00001 M17/128-RG400, M17/175-00001	670

Cable retention force: The cable retention force shall be in accordance with table III.

TABLE III. Cable retention force.

Cable dielectric outer diameter	Pounds (min)	
	Single braid	Double braid
Inches (max)		
.036	10	N/A
.067	20	N/A
.110	30	N/A
.122	40	45

Coupling mechanism retention force: 60 pounds, minimum.

Safety wire hole pull out: Applicable.

RF leakage: -60 dB minimum tested at a frequency between 2 and 3 GHz.

RF insertion loss: dB maximum = .06 x $\sqrt{\text{freq GHz}}$. Test frequency at 6.0 GHz.

Part number: M39012/55- (dash number from table I or "B" number from table V).

TABLE IV. Group qualifications and retention testing.

Group	Submission and qualification of any of the following connectors 1/ 2/	Qualifies the following connectors 3/
I	M39012/55-‡009	M39012/55-‡006 M39012/55-‡007 M39012/55-‡008 M39012/55-‡009 M39012/55-‡010 M39012/55-‡030
II	M39012/55B‡015	M39012/55B‡011 M39012/55B‡012 M39012/55B‡013 M39012/55B‡014 M39012/55B‡015 M39012/55B‡016 M39012/55B‡017
III	M39012/55B‡022	M39012/55B‡018 M39012/55B‡019 M39012/55B‡020 M39012/55B‡021 M39012/55B‡022 M39012/55B‡023 M39012/55B‡024
IV	M39012/55-‡028	M39012/55-‡025 M39012/55-‡026 M39012/55-‡027 M39012/55-‡028 M39012/55-‡029
V	M39012/55-‡502	M39012/55-‡502

1/ Individual connectors other than listed are self qualifying only.
2/ Qualification of connectors qualifies connectors of the same material only.
3/ Connectors qualified with safety wire holes automatically qualifies connectors without safety wire holes.
‡ Denotes material.

NOTES:

1. For qualification retention, where more than one part is listed in a group in this column, data may be supplied on any of those parts in order to retain qualification for those parts in the corresponding right hand column. The part does not necessarily have to be the part initially qualified.

2. If a connector manufacturer produces a connector which meets all the requirements for two or more connector part numbers (within the same series), the manufacturer may receive qualification approval for two or more connector part numbers by qualifying the one connector. It is not necessary that such connectors be in the same group. Each connector, however, must be marked with its own appropriate part number. For group qualification, the connectors must be of similar design.

TABLE V. Category B - Nonfield replaceable (special tools may be required).

Not for Air Force or Navy use. For OEM use only.

M39012/55B ‡	Applicable cable M17/#	Dimensions	Inches 1/ 2/ 3/ 4/ (millimeters) maximum
3011 5/ 3111 6/ 5/ 4011 5/ 4111 6/ 5/	M17/93-RG178 M17/169-00001φ	A	1.250(31.75)
3012 5/ 3112 6/ 5/ 4012 5/ 4112 6/ 5/	M17/119-RG174 M17/113-RG316 M17/173-00001φ M17/172-00001φ		
3013 5/ 3113 6/ 5/ 4013 5/ 4113 6/ 5/	M17/54-RG122* M17/157-00001φ		
3014 5/ 3114 6/ 5/ 4014 5/ 4114 6/ 5/	M17/28-RG058* M17/155-00001φ		
3015 5/ 3115 6/ 5/ 4015 5/ 4115 6/ 5/	M17/60-RG142*@ M17/158-00001φ		
3016 5/ 3116 6/ 5/ 4016 5/ 4116 6/ 5/	M17/84-RG223* M17/167-00001φ		
3017 5/ 3117 6/ 5/ 4017 5/ 4117 6/ 5/	M17/111-RG303* M17/170-00001φ		

See footnotes at end of table.

TABLE V. Category B - Nonfield replaceable (special tools may be required) - Continued.

Not for Air Force or Navy use. For OEM use only.

M39012/55B ‡	Applicable cable M17/#	Dimensions	Inches 1/ 2/ 3/ 4/ (millimeters) maximum
3018 7/ 3118 6/ 7/ 4018 7/ 4118 6/ 7/	M17/93-RG178 M17/169-00001φ		
3019 7/ 3119 6/ 7/ 4019 7/ 4119 6/ 7/	M17/119-RG174 M17/173-00001φ M17/113-RG316 M17/172-00001φ	A	1.375(34.93)
3020 7/ 3120 6/ 7/ 4020 7/ 4120 6/ 7/	M17/54-RG122* M17/157-00001φ		
3021 7/ 3121 6/ 7/ 4021 7/ 4121 6/ 7/	M17/28-RG058* M17/155-00001φ		
3022 7/ 3122 6/ 7/ 4022 7/ 4122 6/ 7/	M17/60-RG142*@ M17/158-00001φ		
3023 7/ 3123 6/ 7/ 4023 7/ 4123 6/ 7/	M17/84-RG223* M17/167-00001φ	A	1.375 (34.93)
3024 7/ 3124 6/ 7/ 4024 7/ 4124 6/ 7/	M17/111-RG303 M17/170-00001φ		

1/ Millimeters are in parentheses.
2/ Coupling nuts shall be corrosion resistant steel with a passivated finish in accordance with MIL-F-14072. Existing qualified parts may be supplied until 25 July 1986. (applies only to "-3XXX" series connectors).
3/ For logistics purposes, only connectors with safety wire holes will be stocked.

TABLE V. Category B - Nonfield replaceable (special tools may be required) - Continued.

| Not for Air Force or Navy use. For OEM use only. |

4/ All corrosion resistant steel bodied connectors which are designed to be assembled to the cable outer conductor using solder shall be gold plated in accordance with MIL-G-45204, type II, class I.
5/ Inactive for new design.
6/ No safety wire holes.
7/ These connectors have captivated center contacts.
The latest version of each cable shall be applicable.
* Cable to be used when performing tests requiring cable except as in note @.
@ Cable to be used for the +200°C temperature cycling tests.
‡ Connectors mate with connectors of the same material; i.e., M39012/59-3001 mates with M39012/55-3001, and M39012/59-4001 mates with M39012/55-4001.
ϕ Caution is directed to the application of this cable above 400 MHz. Attenuation is tested only at 400 MHz. SRL and power handling capabilities are not stipulated herein.

TABLE VI. Maintenance replacements for category B.

Category B dash number*	Category C dash number	Category A dash number	Category D dash number
B‡011	025	006	---
B‡012	026	007	---
B‡013	027	008	---
B‡014	029	009	---
B‡015	028	009	502
B‡016	028	009	---
B‡017	029	010	---
B‡018	025	006	---
B‡019	026	007	---
B‡020	027	008	---
B‡021	029	009	---
B‡022	028	009	502
B‡023	028	009	---
B‡024	029	010	---

*Category B connectors are for original installation only. They will not be stocked or acquired by the Government.

‡The material of the item shall be the same material as the item being replaced. Example: 55B3011 (corrosion resistant steel) replaces 55-3025.

TABLE VII. Cross reference of part numbers.

M39012/55B 1/	M39012/55-	M39012/55B 1/	M39012/55-
‡011	‡011	‡018	‡018
‡111	‡111	‡118	‡118
‡012	‡012	‡019	‡019
‡112	‡112	‡119	‡119
‡013	‡013	‡020	‡020
‡113	‡113	‡120	‡120
‡014	‡014	‡021	‡021
‡114	‡114	‡121	‡121
‡015	‡015	‡022	‡022
‡115	‡115	‡122	‡122
‡016	‡016	‡023	‡023
‡116	‡116	‡123	‡123
‡017	‡017	‡024	‡024
‡117	‡117	‡124	‡124

1/ The 'B' part number is required marking for connectors manufactured after 3 April 1987. The connectors that are in stock or distribution that were previously qualified and marked with the old part number shall also be considered acceptable for Government use until stock is purged. (Applies to category 'B' part number change only; M39012/XXBXXXX).

‡ The material of the item shall be the same material as the item being replaced. Example: 55B3011 (corrosion resistant steel) replaces 55-3025.

Revision letters are not used to denote changes due to the extensiveness of the changes.

CONCLUDING MATERIAL

Custodians:
Army - CR
Navy - EC
Air Force - 85
NASA - NA

Review activities:
Army - EA, MI
Navy - SH
Air Force - 11, 17, 99
DLA - ES

User activities:
Army - AT, AV
Navy - AS, MC, OS, SH
Air Force - 19

Preparing activity:
Army - CR

Agent:
DLA - ES

(Project 5935-3754-01)